Integration of Site Selection, Design, and Construction Tools

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FY03	***FY04***	***FY05***	***FY06***
$162K	***$200K***	***$200K***	***$200K***

Joint Rapid Airfield Construction

Project Description

Objective: Develop and integrate the tools necessary for a complete and efficient design and construction process for contingency airfield construction.

Scope:

- **Product development and evaluation (FY03-04) -** will focus on design and execution tools that will assist in the construction of contingency airfields.
- **Integration (FY04-06) -** will focus on combining and ensuring technical compatibility between products from the three JRAC thrusts: *Site Selection*, *Enhanced Construction*, and *Rapid Stabilization*.

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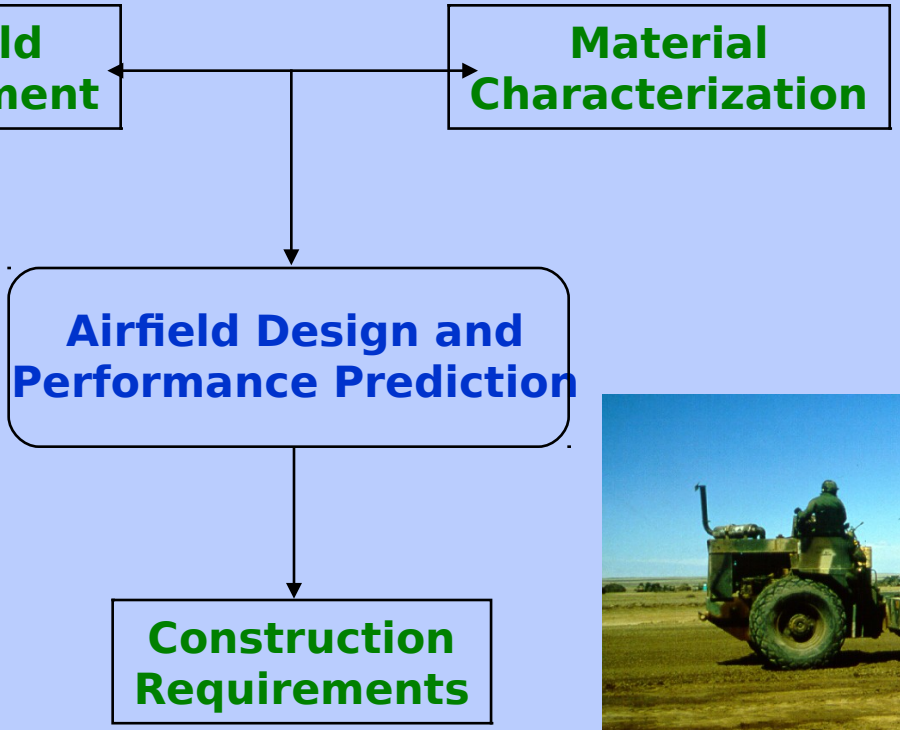
Joint Rapid Airfield Construction

Plan/Progress/Approach

- **Plan -** Integration



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Plan/Progress/Approach

- **Plan - Product Development and Evaluation**
  - Evaluate COTS Products for Use as Rapid Quality Control Tools
    - Moisture Determination Devices – FY03
      - *Conducted a study to evaluate eight different devices or methods*
      - *Evaluation of accuracy, repeatability, and ease of use*
    - Non-Nuclear Density Devices – FY04
  - Develop Rapid Design Procedures for Various Airfield Geometries
    - Capability to design on site
    - Prepackaged designs that overlay rapidly acquired terrain data
  - Real-Time Statistical Evaluation of Construction Data
    - Optimize number of tests
    - Identify significant spatial differences

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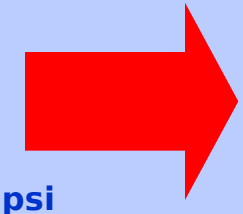
C-130 Aircraft

175,000-lb

Contingency Tire Pressure = 98.44 psi



C-17 Aircraft

447,000-lb

Contingency Tire Pressure = 120 psi

- **Water Content Determination Study**
  - Three different soil types each at three different moisture levels
    - CH – fat clay (buckshot)
    - SM – silty sand
    - ML – silt
  - Eight different methods or devices
  - Preliminary results
    - TDR lacks the accuracy but is very fast
    - Microwave appears to be a good solution (accuracy and speed)

Joint Rapid Airfield Construction

FY04 Demonstration Vision

- **Remember the name?**

“Integration of Site Selection, Design, and Construction Tools”

- **Create and Demonstrate the platform that will accommodate the required tools and capabilities**
  - **Leverage existing Tele-Engineering Systems**
    - ***Automated Route Reconnaissance Kit (ARRK)***
    - ***TeleEngineering Communications Equipment – Deployable (TCE-D)***

Vehicle Capabilities

- **Reconnaissance (technical and tactical)**
- **Rapid and accurate topographic data collection**
- **Rapid, on-site, airfield design (complete and upgrade)**
- **Quality quality control and assurance (structural and geometric)**
- **Rapid data transmission**

Quality Control / Quality Assurance

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Project Boundary

Location (ft)

	N	E
Add	2500.01	1750.36
Remove		

Units of Measure

lb / ft³

Target Values

	Lower	Off	Upper	Off
Marginal	96.5	☐		☐
Unacceptable	92.5			

Percent Marginal Allowed: 5.0

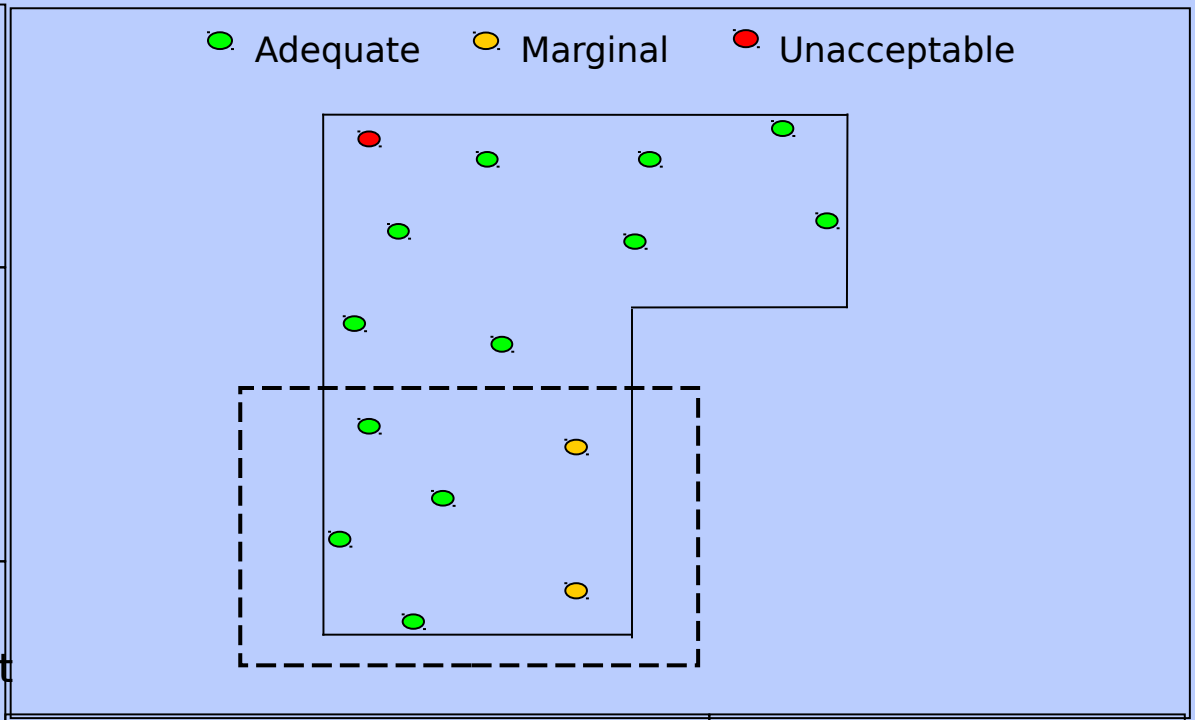
Test Results

Location (ft)

	N	E	Measurement
Add	1813.75	1205.14	101.2
Remove			

Statistics for Selected Region

Area (sq.yd.)	1283.6
Quantity of Tests	6



Predicted Quality of Selected Region

Percent Adequate	82.0
Percent Marginal	12.5
Percent Unacceptable	5.5

Summary of Sufficiency

Quantity of Tests	●
Test Spacing	●
Material Quality	●

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Products

Description:

- Rapid topographic data collection
- A rapid design procedure and pre-packaged designs.
- Procedures and requirements for effective and efficient field testing.
- Synergy between material characteristics that are: 1) obtained during site assessment, 2) needed for performance prediction models, and 3) specified for construction control.

Connectivity to other Work Units: This work unit will provide a critical link between the three JRAC research thrusts: site selection, enhanced construction productivity, and rapid stabilization.

Transition Medium: Products will either be integrated into the JRAC software package or identified as requirements through specifications.

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